MAKING MODERN LIVING POSSIBLE

User Manual

Danfoss Telematics Solutions

Logging Data

powersolutions.danfoss.com

Revision history

Table of revisions

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About this Manual

General

This document is part of the Danfoss Telematics Solutions portal and provides important information on the intended use, and operation of the portal described below.

The device is delivered with a basic configuration. Customize the configuration to your purposes by defining the CAN messages to be logged and by using the WS Configurator tool to update the device configuration (via CAN bus or remotely).

Creating object dictionary groups and objects

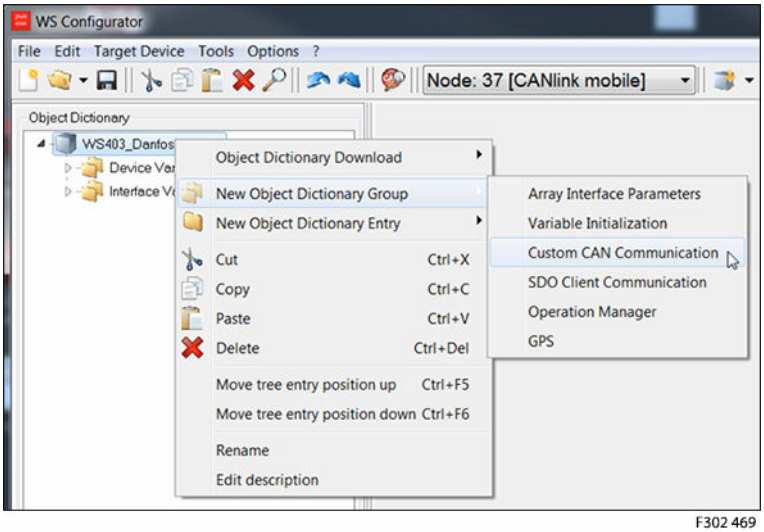
Configure the device with WS Configurator. You can find the basic instructions for this in *WS 403 Remote Solution Installation Guide - L1419125*.

You can create, rename, or remove object dictionary groups or objects in the tree structure.

Below is an explanation of how to create object dictionary groups and objects. In the example, the object RECEIVE MESSAGE PDO is created.

In order to create the object **Receive Message PDO**, you need the object dictionary group CUSTOM CAN COMMUNICATION and then the object dictionary group **Receive CAN Messages (PDOs)**.

1. Open the **WSxxx_DanfossDefault.DOD** configuration file
2. Right-click on the top entry in the tree structure to open the context menu.
3. In the context menu, click on **New Object Dictionary Group** > **Custom CAN Communication**. This creates the object dictionary group **Custom CAN Communication**.



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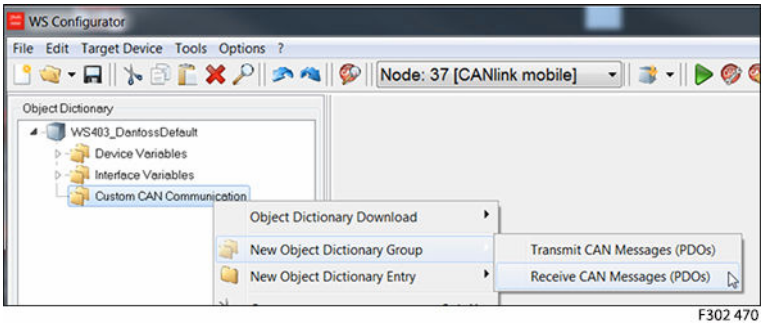
4. Right-click on the object dictionary group **Custom CAN Communication**.
5. In the context menu, click on **New Object Dictionary Group** > **Recieve CAN Messages (PDOs)**. This creates the object dictionary group **Receive CAN Messages (PDOs)**.



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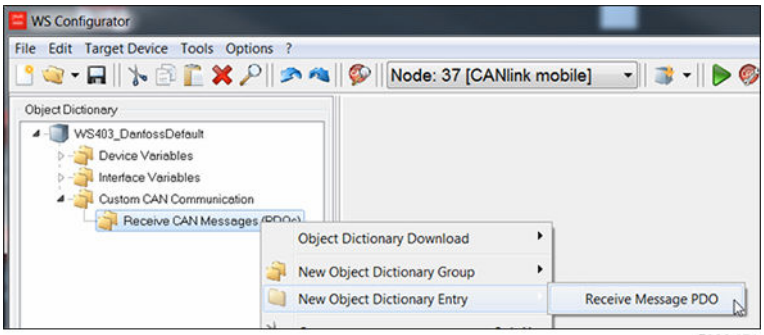
6. Right-click on the object dictionary group **Recieve CAN Messages (PDOs)**.

Creating object dictionary groups and objects

7. In the context menu, click on **New Object Dictionary Entry** > **Recieve Message PDO**.



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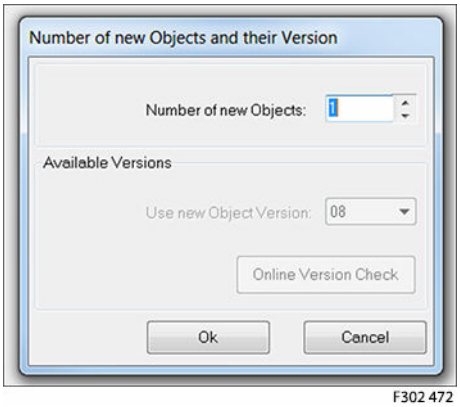
This opens the window **Number of new Objects and their Version**.



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8. Under **Number of new Objects**, enter the number of objects (received messages) you want to create.
   In this example: 1.
9. Click on the **OK** button.
   The object **Receive Message PDO** is created.

Rename entry

Rename an entry in the tree structure;

1. Click on the corresponding entry to select it.
2. Click on the entry again to rename it.

Modifying the logging configuration

In logging mode, the device logs CAN messages, GNSS data, and internal variables. All logged data is saved to an internal, nonvolatile memory and sent to the DTS portal.

Alternatively, you can also save the data to an inserted microSD memory card. You can read off the data saved on the microSD memory card using the USB interface.

The internal nonvolatile memory has a capacity of 32 MB and can save a maximum of 5000 files.

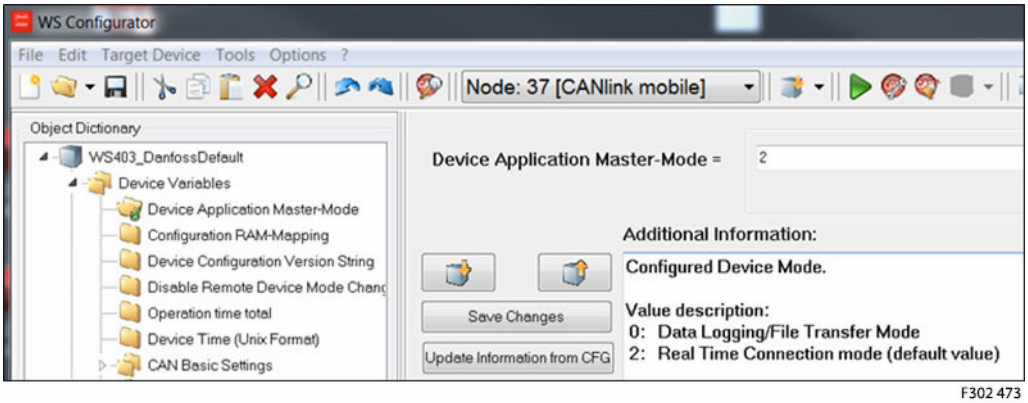
When the memory is full, each new file saved is overwritten over the oldest file. Here you will find an explanation of how to configure the device, using some concrete examples.

You must define basic variables in order to correctly link up the device with an existing CAN network.

Configuring the device for Data Logging

Creating object dictionary groups and objects

1. In the object dictionary group **Device Variables**, click on the variable **Device Application Master-Mode**.



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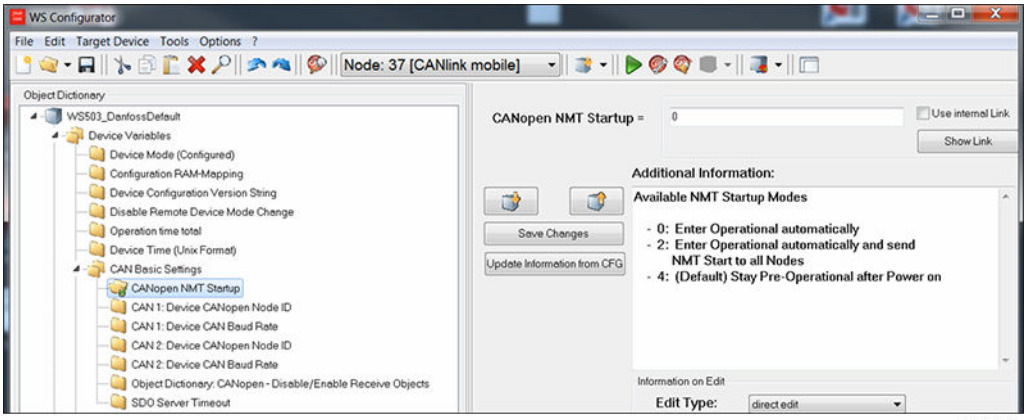
2. Enter the value **0** to enable **Data Logging/File Transfer Mode**.

Logging CAN messages and sending them to DTS portal

You must configure at least the following variables to enable CAN communication (the variables belong to the object dictionary group **Device Variables** > **CAN Basic Settings**):

- CANopen NMT Startup
- CAN1 Device CANopen Node ID
- CAN1 Device Baud Rate
- CAN2 Device CANopen Node ID
- CAN2 Device Baud Rate



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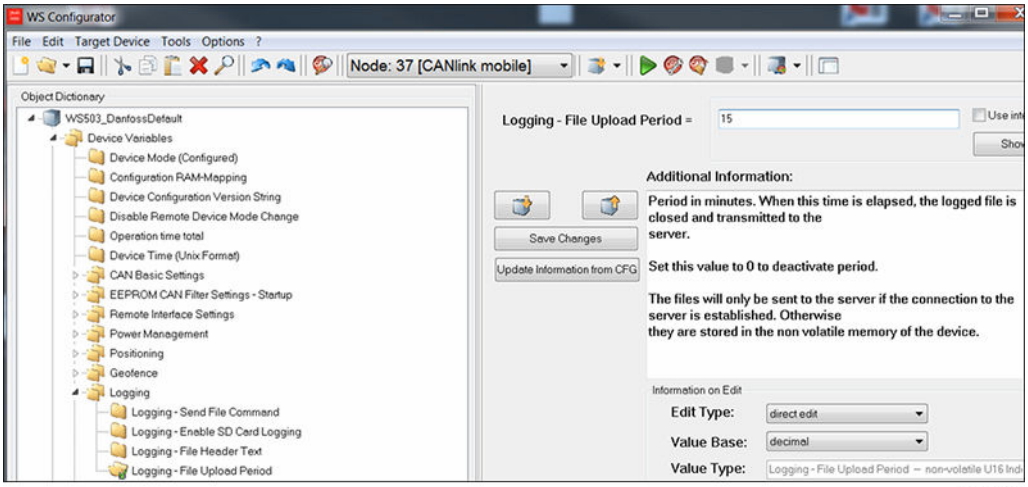
Variable	Value	Function
CANopen NMT Startup	0	Automatically sets the device to CANopen mode **Operational**.
CAN1: Device CANopen Node ID	1 … 127 (default 37)	The CANopen node address / device ID number (can be left at standard value).
CAN1: Device Baud Rate	min. 50 kbit/s max. 1 Mbit/s (default: 250 kBit/s)	The bit rate at which the CAN bus operates

Creating object dictionary groups and objects

Variable	Value	Function
CAN2: Device CANopen Node ID	1 … 127 (default 37)	The CANopen node address / device ID number (can be left at standard value).
CAN2: Device Baud Rate	min. 50 kbit/s max. 1 Mbit/s (default: 250 kBit/s)	The bit rate at which the CAN bus operates

For the logfiles, you must configure further variables (These variables belong to the object dictionary group **Device Variables** > **Logging**):

- Logging – File Upload Period
- Logging – File Header Text
- Logging – Send File Command


WS Configurator
File Edit Target Device Tools Options ?
Node: 37 [CANlink mobile]
Object Dictionary
WS503_DanfossDefault
Device Variables
Device Mode (Configured)
Configuration RAM-Mapping
Device Configuration Version String
Disable Remote Device Mode Change
Operation time total
Device Time (Unix Format)
CAN Basic Settings
EEPROM CAN Filter Settings - Startup
Remote Interface Settings
Power Management
Positioning
Geofence
Logging
Logging - Send File Command
Logging - Enable SD Card Logging
Logging - File Header Text
Logging - File Upload Period
Logging - File Upload Period =
15
Additional Information:
Period in minutes. When this time is elapsed, the logged file is closed and transmitted to the server.
Save Changes
Update Information from CFG
Set this value to 0 to deactivate period.
The files will only be sent to the server if the connection to the server is established. Otherwise they are stored in the non volatile memory of the device.
Information on Edit
Edit Type:
direct edit
Value Base:
decimal
Value Type:
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Variable	Function
Logging – File Upload Period	Period in which the logfile is completed and sent to the DTS Portal. 0 = data is sent when the size of the logfile reaches 1 kB.
Logging – File Header Text	Information text in the head of each logfile. Can contain for instance version information (max. 32 characters).
Logging – Send File Command	Assign any value to the variable during operation in order to close and send the existing logfile.

The logfile is sent to the DTS Portal when its size reaches 1 kB, irrespective of the time set.

Receiving the J1939 message

Using the example of the receipt of the J1939 message (with PGN 61444 Electronic Engine Controller 1), we will explain the general procedure for configuring CAN messages received. The procedure can also be applied to other CAN messages from other CAN protocols.

Creating a PGN 61444

You require an object **Receive Message PDO** in the object dictionary group **Custom CAN Communication** > **Receive CAN Messages (PDOs)**.

1. Create the object dictionary group **Custom CAN Communication** > **Receive CAN Messages (PDOs)** , if it does not already exist.

   See *Creating object dictionary groups and objects* on page 6.
2. Create the object **Recieve Message PDO** in the object dictionary group **Receive CAN Messages (PDOs)**.

Creating object dictionary groups and objects

3. Rename the object.

In this example in PGN 61444.

PGN 61444 Electronic Engine Controller 1

Transmission Repetition:	engine speed dependent
Data Length:	8
Default Priority:	3
Parameter Group Number:	61444

Start Position	Length	Parameter Name	SPN
1.1	4 bits	Engine Torque Mode	899
2	1 byte	Driver's Demand Engine - Percent Torque	512
3	1 byte	Actual Engine - Percent Torque	513
4-5	2 bytes	Engine Speed	190
6	1 byte	Source Address of Controlling Device of Engine	1483
7.1	4 bits	Engine Starter Mode	1675
8	1 byte	Engine Demand - Percent Torque	2432

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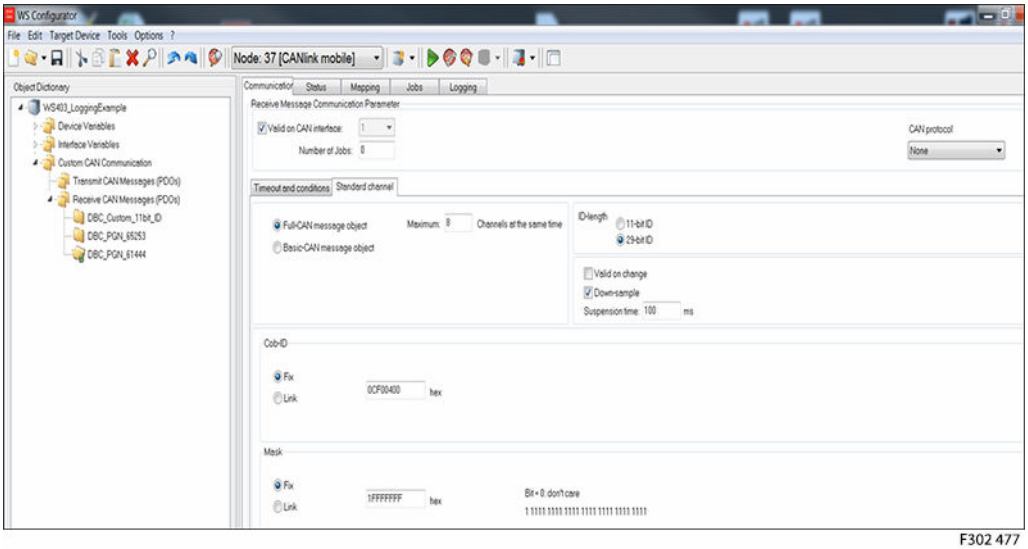

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Receive Message Communication Parameters

1. Click on the **Communication** tab and make the following settings:

Description	Selection	Result
CAN Protocol	None	The receive CAN message is a single message (Layer 2).
Valid on CAN Interface	Set	Activates the configuration, sets the reception channel (if several are available).

2. Click on the **Standard Channel** tab in the **Communication** tab and make the following settings:

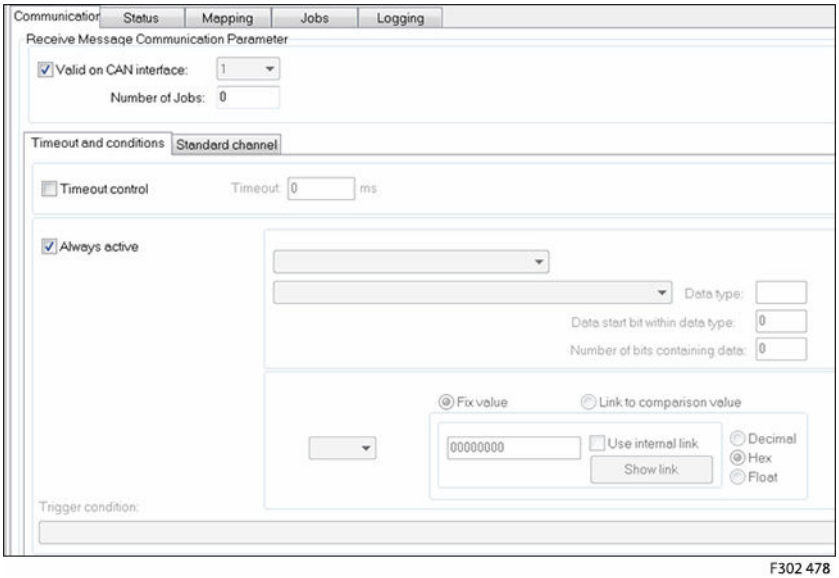
Description	Selection	Result
Full CAN Message Object	Set	Assigns the receive message to a controller channel.
ID-Length	29-bit ID	ID length of the CAN message to be received.
DOWN-SAMPLE	Set (100)	Receive message max. every 100 ms (not every 10ms as transmitted)

Creating object dictionary groups and objects

Description	Selection	Result
Cob-ID	Fix (00F00400)	Fixed identifier of the receive message (J1939 PGN 61444).
Mask	Fix (00FFFF00)	This mask determines that bits 8 … 24 of the identifier fixed in Cob-ID must not vary in the identifier of the receive message. In the J1939 protocol, this is the PGN area. The first bits of the identifier define the priority and the last bits of the identifier define the source address. That is why these bits of the identifier in the J1939 protocol can be different and are not evaluated on reception in this example.

Timeout and Conditions

1. Click on the **Timeout and conditions** tab in the **Communication** tab



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2. Make the following settings:

Description	Selection	Result
Always active	Set	The CAN message is received irrespective of events or conditions.

Logging of all data bytes every 60 seconds

Example 1

Simple cyclical logging without checking additional conditions.

The example is based on the settings in the chapter *Receiving the J1939 message* on page 9.

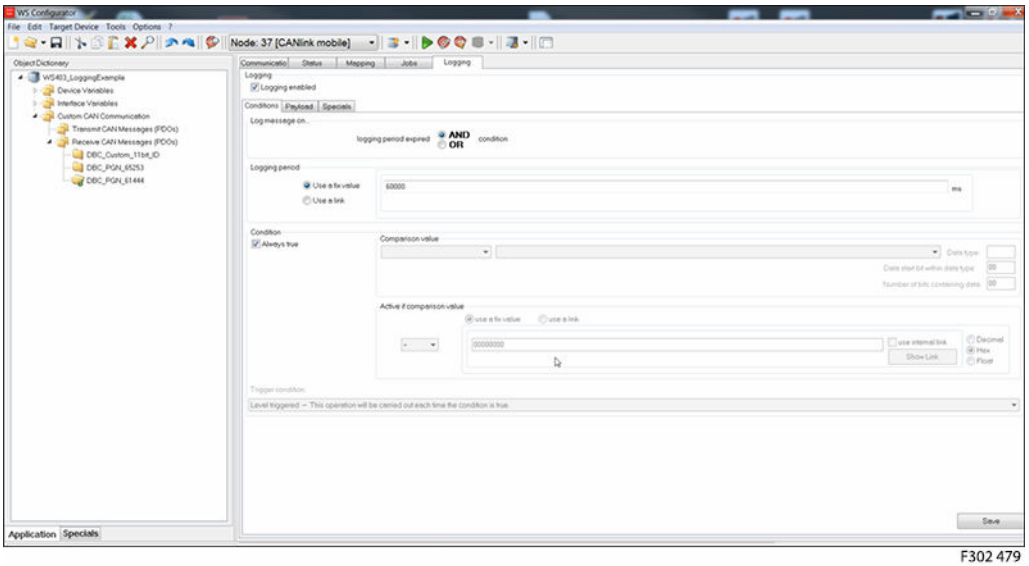
Logging

Conditions

1. Click on the **Logging** tab.

Creating object dictionary groups and objects

2. In the **Logging** tab, click on the **Conditions** tab.



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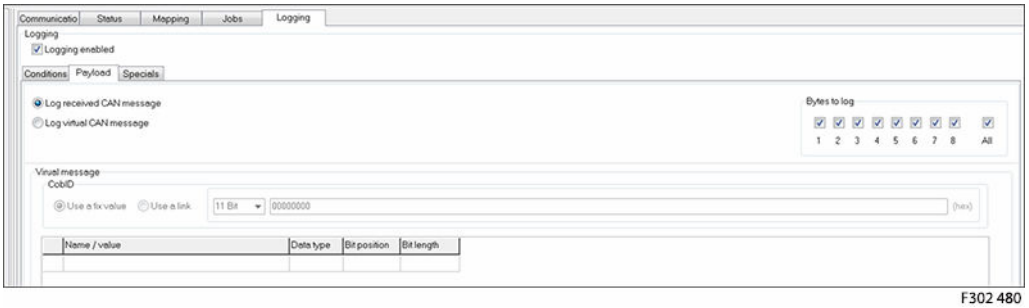
3. Make the following settings

Description	Selection	Result
Logging enabled	Set	Logging enabled
Log message on	AND	The data is only logged when timeout is reached AND the condition is met.
Logging period	Use a fix value (60000)	Duration of the logging interval in milliseconds.
Condition / Always true	Set	Logging takes place without prior checking of conditions.

Payload

1. In the **Logging** tab, click on the **Payload** tab.



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2. Make the following settings:

Description	Selection	Result
Log received CAN message	Set	Log the data of the receive CAN message.
Bytes to log	All	Log all data bytes.

3. Save the configuration file and load the configuration to the device as described in *Configuring the device for Data Logging* on page 7.

Creating object dictionary groups and objects

Log specific bytes under certain conditions or every 10 minutes

Example 2

More complex logging based on the following conditions.

The example is based on the settings in the chapter *Receiving the J1939 message* on page 9.

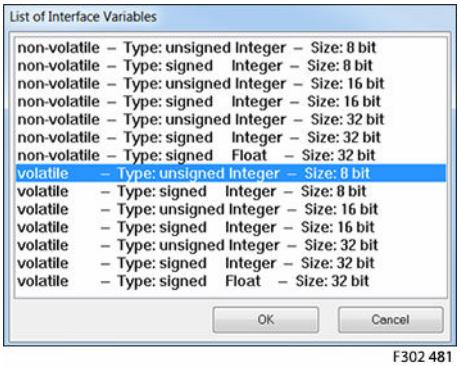
Log bytes 2 to 5 and 8 of the receive message if the engine speed (byte 4 - 5) has changed by ± 500 rpm, or every 10 minutes.

Variables

You need various variables for checking values if you want to log data only under certain conditions.

To set the corresponding variables, you need the object dictionary group **Interface Variables**.

1. Create the object dictionary group **Interface Variables** if it does not already exist.
   See *Creating object dictionary groups and objects* on page 6.
2. Create 4 interface variables in the object dictionary group **Interface Variables**.
   For each variable, the window **List of Interface Variables** opens.


List of Interface Variables
non-volatile – Type: unsigned Integer – Size: 8 bit
non-volatile – Type: signed Integer – Size: 8 bit
non-volatile – Type: unsigned Integer – Size: 16 bit
non-volatile – Type: signed Integer – Size: 16 bit
non-volatile – Type: unsigned Integer – Size: 32 bit
non-volatile – Type: signed Integer – Size: 32 bit
non-volatile – Type: signed Float – Size: 32 bit
volatile – Type: unsigned Integer – Size: 8 bit
volatile – Type: signed Integer – Size: 8 bit
volatile – Type: unsigned Integer – Size: 16 bit
volatile – Type: signed Integer – Size: 16 bit
volatile – Type: unsigned Integer – Size: 32 bit
volatile – Type: signed Integer – Size: 32 bit
volatile – Type: signed Float – Size: 32 bit
OK
Cancel
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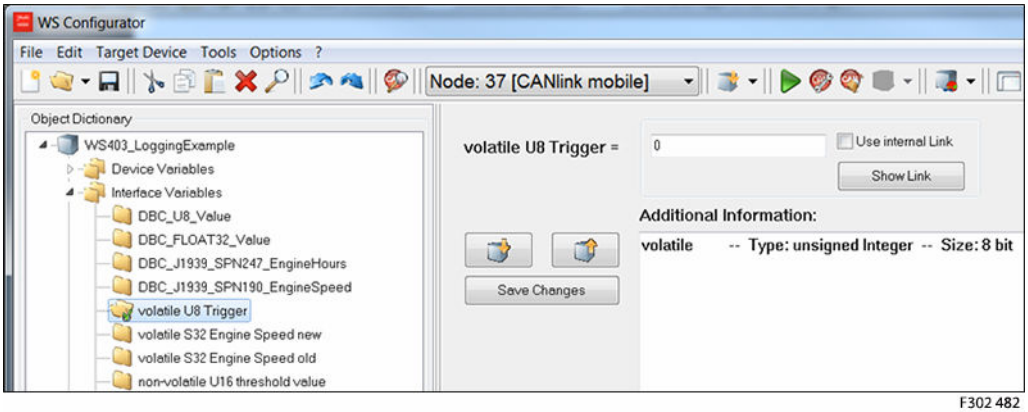
3. Click on the variable you require.
4. Click on the **OK** button.
   The selected variable is created.
5. Repeat the process for each variable.



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6. Rename the variables in a useful way.

   You need the following variables for the value checks.

Description	Type	Sign	Size
volatile U8 Trigger	volatile	unsigned	8 bits
volatile S32 Engine Speed new	volatile	signed	32 bits

Creating object dictionary groups and objects

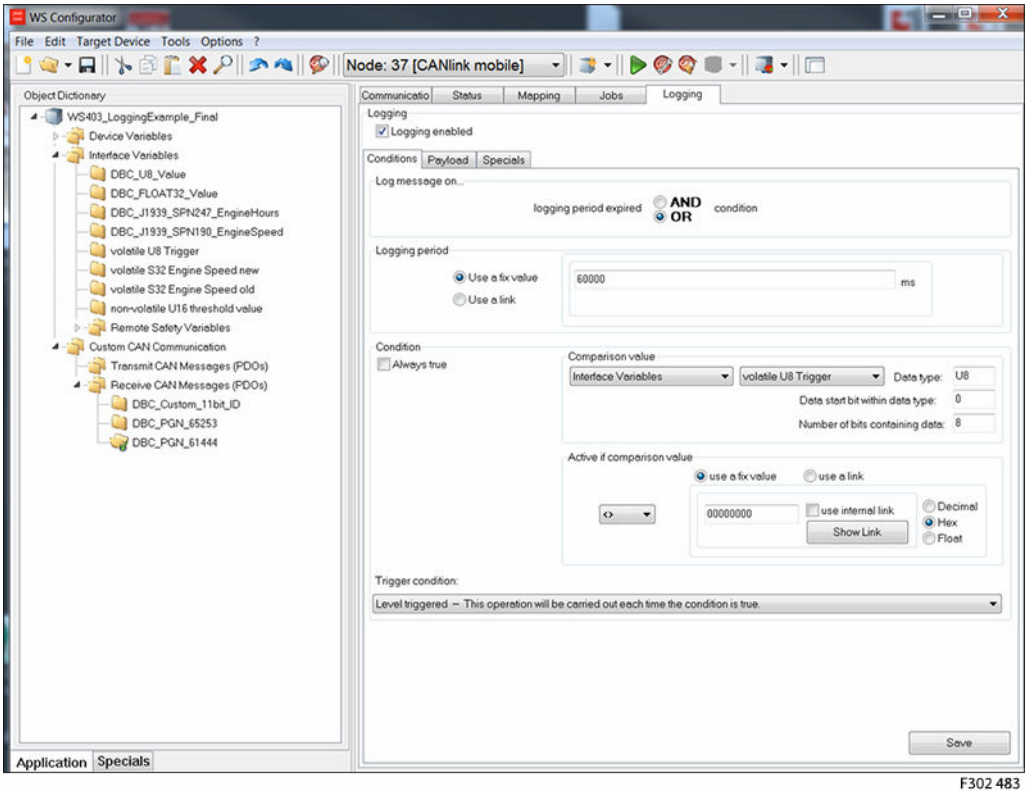
Description	Type	Sign	Size
volatile S32 Engine Speed old	volatile	signed	32 bits
non-volatile U16 threshold value	non-volatile	unsigned	16 bits

Logging

Enter the following settings in the PGN 61444 object dictionary in the **Custom CAN Communication** object dictionary group.

Conditions

1. Click on the **Logging** tab.
2. In the **Logging** tab, click on the **Conditions** tab.



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3. Make the following settings:

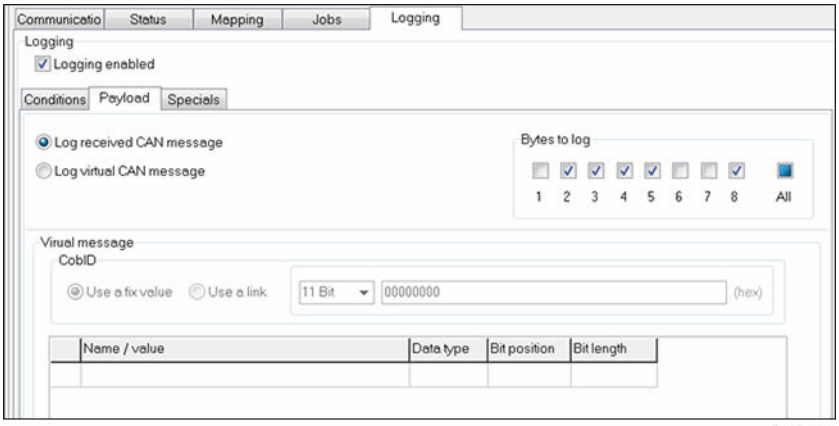
Description	Selection	Result
Log message on	OR	The data is logged when timeout is reached OR the condition is met.
Logging period	Fix value (600000)	Duration of the logging interval in milliseconds.
Condition / Always true	not set	The data is logged irrespective of the result of the check.
Comparison value	volatile U8 Trigger	Logging depends on the **volatile U8 Trigger** variable.
Number of bits containing data	8	All 8 bits of the variable are compared with the comparison value.

Creating object dictionary groups and objects

Description	Selection	Result
Active if comparison value	<>0	Data is only logged if the variable **volatile U8 Trigger** is not equal to 0.
Trigger condition	This operation will be carried out each time the condition is true	Logging is enabled as long as the variable **volatile U8 Trigger** is not equal to 0.

Payload

1. In the **Logging** tab, click on the **Payload** tab



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2. Make the following settings:

Description	Selection	Result
Log received CAN message	Set	Log the data of the receive CAN message.
Bytes to log	2..5 and 8	Log selected data bytes.

Mapping

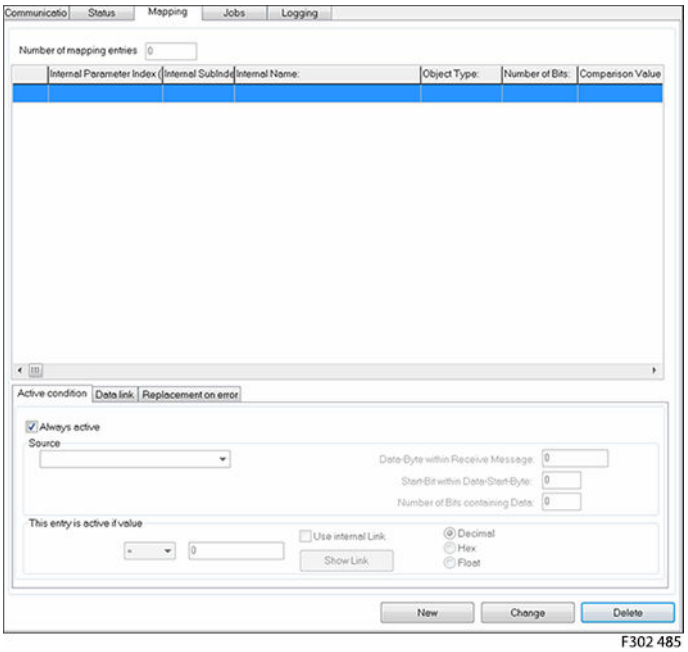
During mapping, data is copied from the CAN message to variables. You can then process the copied data in the device and perform calculations.

Active Conditions

1. Click on the **Mapping** tab.

Creating object dictionary groups and objects

2. Click on the **Active condition** tab in the **Mapping** tab.



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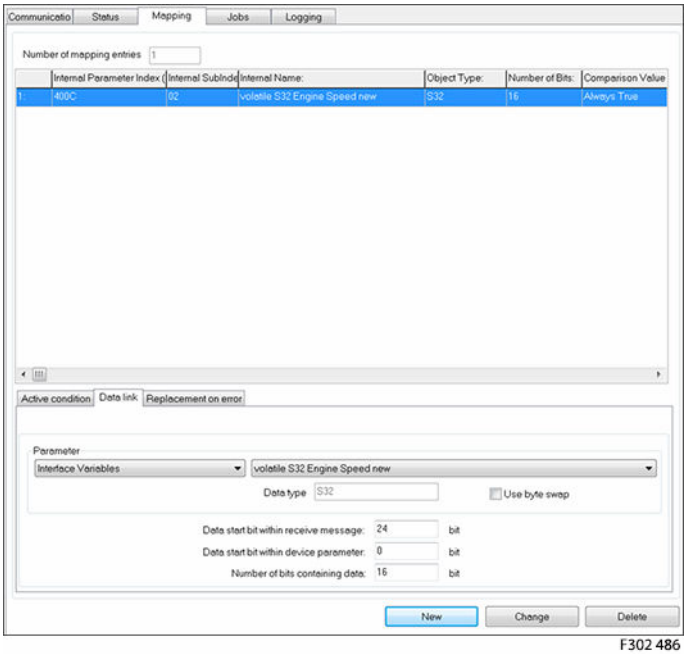
3. Make the following settings:

Description	Selection	Result
Always active	Set	Mapping always takes place without conditions.

Data Link

1. Click on the **Data link** tab in the **Mapping** tab.



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Creating object dictionary groups and objects

2. Make the following settings:

Description	Selection	Result
Parameter	**volatile S32 Engine Speed new**	The data is written to the **volatile S32 Engine Speed new** variable.
Data start bit within receive message	24 bits	The data used starts with bit 24 (from byte 4).
Number of bits containing data	16 bits	The data used has 16 bits (2 bytes).

3. Click on the **New** button to create the mapping entry.

   The mapping entry is adopted in the table.

   The data is copied into the internal variable on receipt of the CAN message.

Jobs

Change to the **Jobs** tab.

Every time a CAN message is received, jobs are performed after mapping and before logging. In the **Jobs** tab, configure the calculation operations you need for your job.

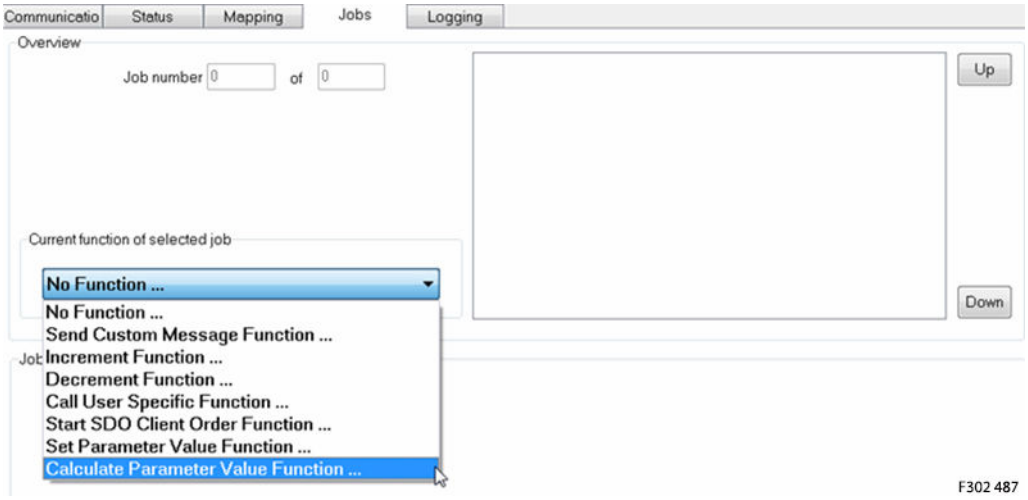
For the example configuration, you need two jobs of type **Calculate Parameter Value Function**. With this function, you perform calculation operations and overwrite interface variables with calculated values.

Job 1

With the first job (Job 1), you check whether the current engine speed is above or below the threshold value. If one of these cases applies, set the variable **volatile U8 trigger** to 1, which triggers logging of the message.

1. Click on the **Jobs** tab.
2. In the list under **Current function of selected job**, click on **Calculate Parameter Value Function**.

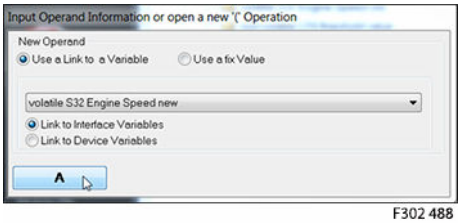
   The jobs already defined are listed in the adjacent field.



3. In the list adjacent to **Result**, click on **volatile U8 trigger**.
4. Using the buttons on the tab, enter the calculation operations **(A < (B - C)) or (D > (E + F))**

   If you click on the placeholder (e.g. **A**), this opens the window **Input Operand Information or open a new "(" Operation**. To find out which variables you must assign to the placeholders, see Table Variables for Job1.

Creating object dictionary groups and objects


Input Operand Information or open a new '(' Operation
New Operand
Use a Link to a Variable
Use a fix Value
volatile S32 Engine Speed new
Link to Interface Variables
Link to Device Variables
A

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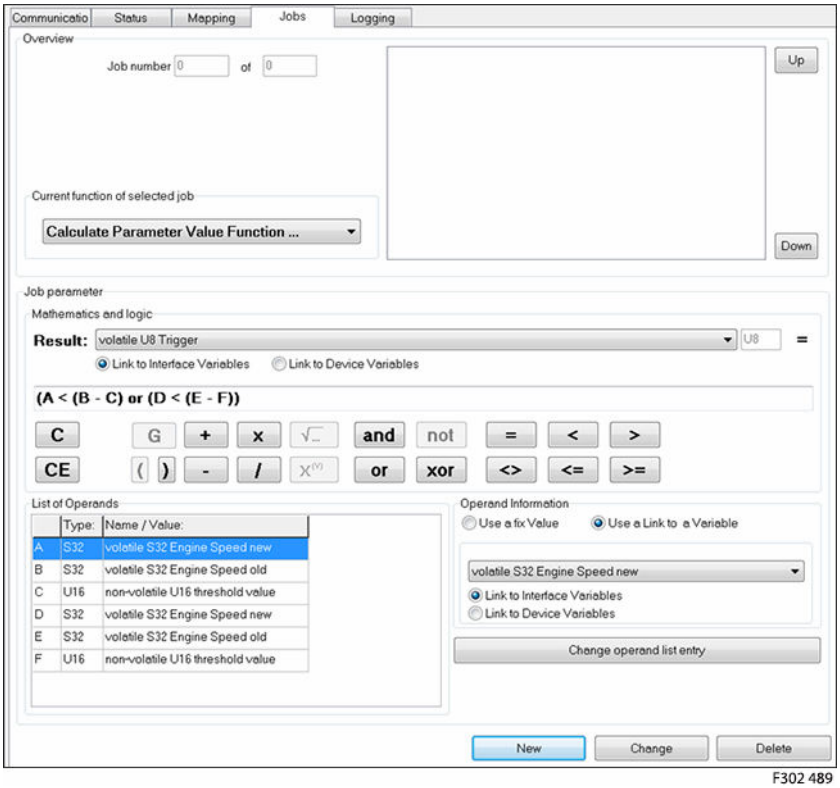
5. In the list, click on the variable you want to assign to the placeholder (in the example, for A, the variable **volatile S32 Engine Speed New**).
6. Click on the button with the placeholder (e.g. **A**).
7. Click on the **New** button when you have entered the calculation operations completely.



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The buttons for entering the calculation operations have the following functions:

Buttons	Description
C CE	**C** = Clear: Deletes the entire calculation operation
	CE = Clear Entry: Only deletes the last symbol entered
A	Add variables to the calculation operation. Click on the button to open a window. Assign fixed values, interface variables, or device variables to the variables. After you have defined a variable, the display on the button jumps to the next variable. The selected variables are listed under **List of operands**, including their values and types.
+ − x /	Basic calculation types (addition, subtraction, multiplication, division)

Creating object dictionary groups and objects

Buttons	Description
and or	**and** = logical AND link If all linked operands are true or not equal to zero, the result is Operation 1. Otherwise, the result is Operation 0.
	or = logical OR link If one of the linked operands is true or not equal to zero, the result is Operation 1. Otherwise, the result is Operation 0. If both linked variables are full-number values (integers), the link is made by bits.
= < > <> <= >=	Comparison signs (equal to, smaller than, greater than, not equal to, smaller or equal to, and larger or equal to) The result is 1 when the comparison is true. The result is 0 when the comparison is not true.
( )	Brackets

The calculation formulas are evaluated from left to right. Mathematical priority rules are not observed. Define the priority calculations in the formula using brackets.

8. Assign the following variables to the placeholders.

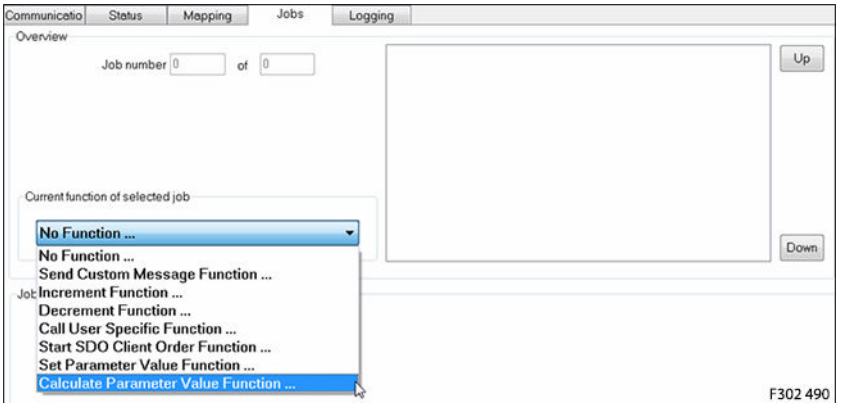
Job 1 variable

Variable	Type	Name/Value
A	S32	**volatile S32 Engine Speed new**
B	S32	**volatile S32 Engine Speed old**
C	U16	**non-volatile U16 threshold value**
D	S32	**volatile S32 Engine Speed new**
E	S32	**volatile S32 Engine Speed old**
F	U16	**non-volatile U16 threshold value**

Job 2

With the second job (Job 2), you replace the value of the variable **volatile S32 Engine Speed Old** with the value of the variable **volatile S32 Engine Speed New** as soon as the variable **volatile U8 Trigger** has the value 1. This updates the speed from which the deviation should be detected.

1. Click on the **Jobs** tab.
2. In the list under **Current function of selected job**, click on **Calculate Parameter Value Function**.
   The jobs already defined are listed in the adjacent field.



3. In the list adjacent to **Result**, click on **volatile S32 Engine Speed Old**.

Creating object dictionary groups and objects

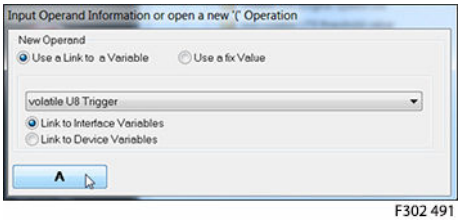
4. Using the buttons on the tab, enter the calculation operations **((A <> B) * C) + ((D – E) * F)**.

   If you click on the placeholder (e.g. **A**), this opens the window **Input Operand Information or open a new "(" Operation**. To find out which variables you must assign to the placeholders, see *Job 2 variable* on page 20.

5. In the list, click on the variable you want to assign to the placeholder

   (in the example, for **A**, the variable **volatile U8 Trigger**).

6. Click on the button with the placeholder (e.g. **A**).


Input Operand Information or open a new '(' Operation
New Operand
Use a Link to a Variable
Use a fix Value
volatile U8 Trigger
Link to Interface Variables
Link to Device Variables
A
F302 491

7. Click on the **New** button when you have entered the calculation operations completely.
8. Assign the following variables to the placeholders.

Job 2 variable

Variable	Type	Name/Value
A	U8	**volatile U8 Trigger**
B	fix	0
C	S32	**volatile S32 Engine Speed new**
D	U8	**volatile U8 Trigger**
E	fix	0
F	S32	**volatile S32 Engine Speed old**

9. Save the configuration file and load the configuration to the device as described in *Configuring the device for Data Logging* on page 7.

Saving CAN messages to microSD memory cards

You can save the data to an inserted microSD memory card. You can read off the data saved on the microSD memory card using the USB interface.

The data (.cls) is saved in the LOG directory. For this, a microSD memory card must be inserted.

Set the variable **Device Variable** > **Logging** > **Enable SD Card Logging** to 1, to enable data logging to the microSD memory card.

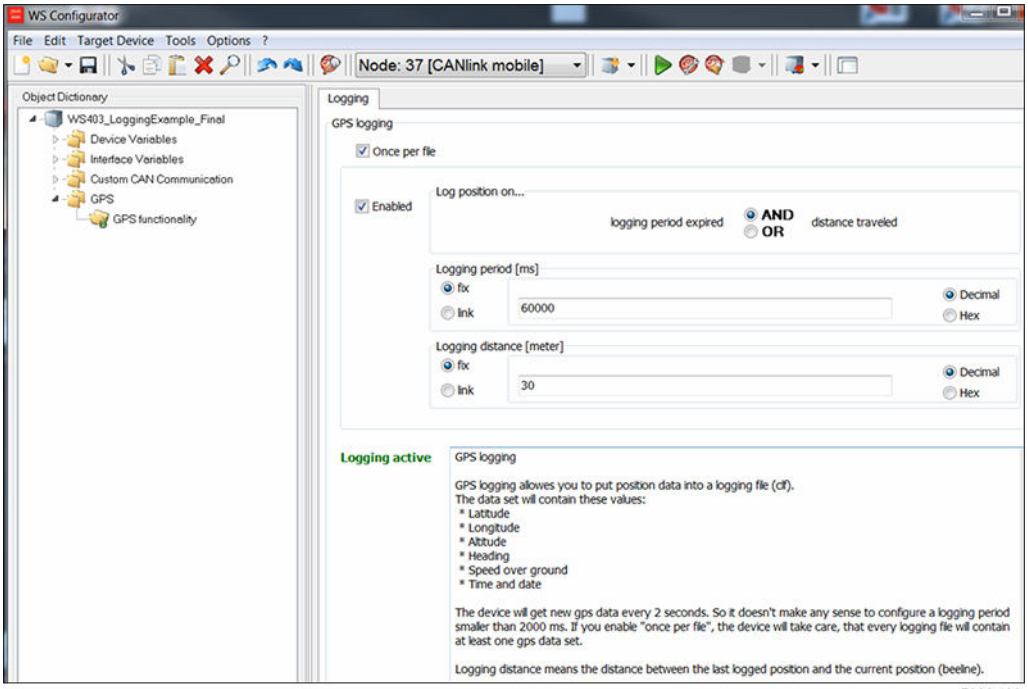
Do not delete data from the **Logging** directory. This could cause problems with sending to DTS server. However, you can delete the entire **Logging** directory with all the data. If the variable **Device Variable** > **Logging** > **Enable SD Card Logging** is set to 0 or no microSD memory card is inserted, the data is saved to the internal nonvolatile memory. The internal nonvolatile memory has a capacity of 32 MB and can save a maximum of 5000 files. When the memory is full, each new file saved is overwritten over the oldest file.

Logging GNSS positions

The GNSS position data contains information on longitude and latitude, altitude, direction, and speed over ground as well as time and date.

Data is only logged when valid position data is received (GNSS LED lights up constantly).

Creating object dictionary groups and objects



F302 492

Make the following settings:

Variable	Function
Once per file	Each logfile contains position data at least once.
Enabled	Enables/ disables the position data logging.
AND / OR	AND: Position data is logged if both conditions (time and distance) are met. OR: Position data is logged if one of the conditions (time or distance) is met.
Logging period	Time period during which the position data should be logged.
Logging distance	Distance between the last position logged and the current position (linear distance).

Logging internal variables

You can log various internal variables. Internal variables can be both device variables and interface variables.

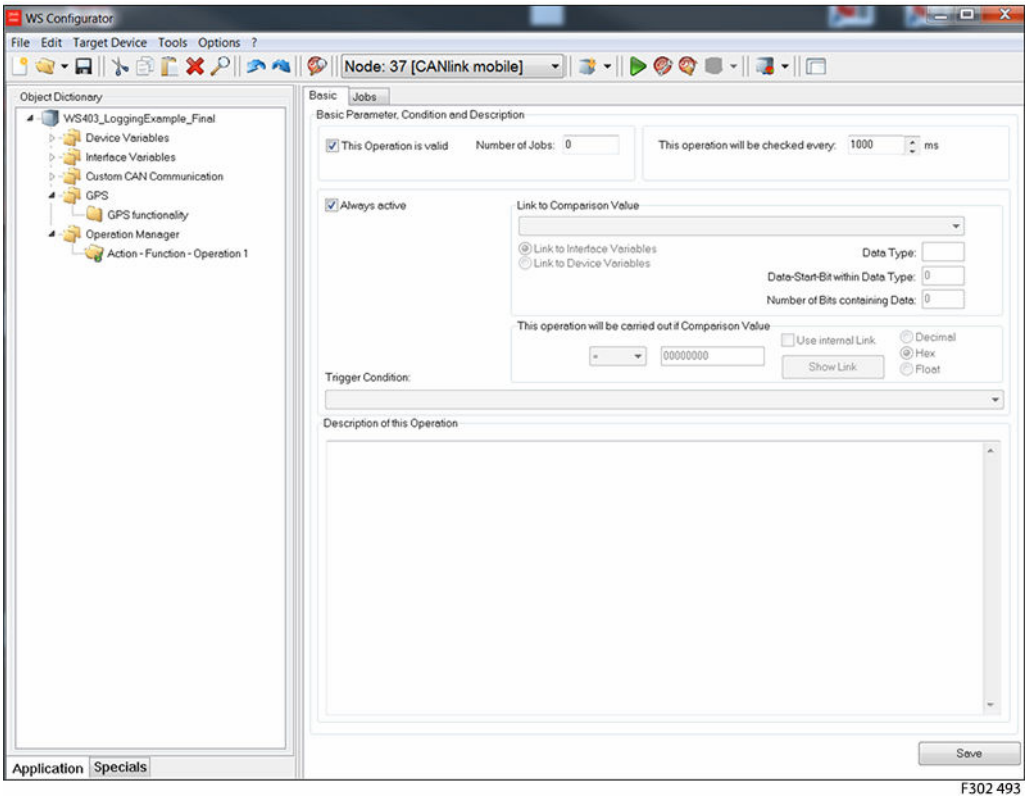
To log internal variables, you need an object **Action - Function - Operation** in the object dictionary group **Operation Manager**. With the object **Action - Function - Operation**, up to 8 internal variables can be logged in one process as a virtual CAN message.

1. Create an **Operation Manager** object dictionary group if it does not already exist.

   See *Creating object dictionary groups and objects* on page 6.
2. Create an object **Action - Function - Operation** in the **Operation Manager** object dictionary group.

Creating object dictionary groups and objects

3. Click on the **Basic** tab.



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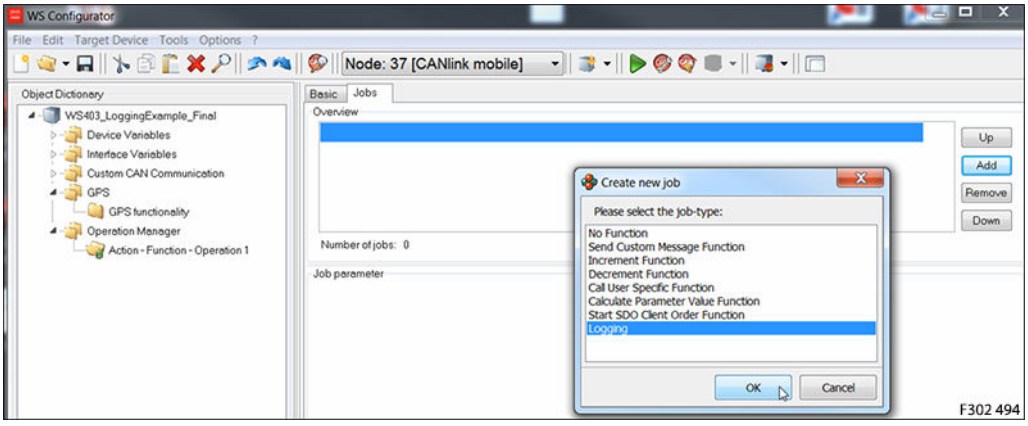
4. Select a time period (in ms) during which you want logging to take place.
5. Enable **Always active** if you want logging to take place irrespective of conditions.
   Alternatively, you can define conditions for logging.
6. Click on the **Save** button.
7. Click on the **Jobs** tab.
8. Click on the **Add** button adjacent to the **Overview** field.
   The **Create new job** window opens.



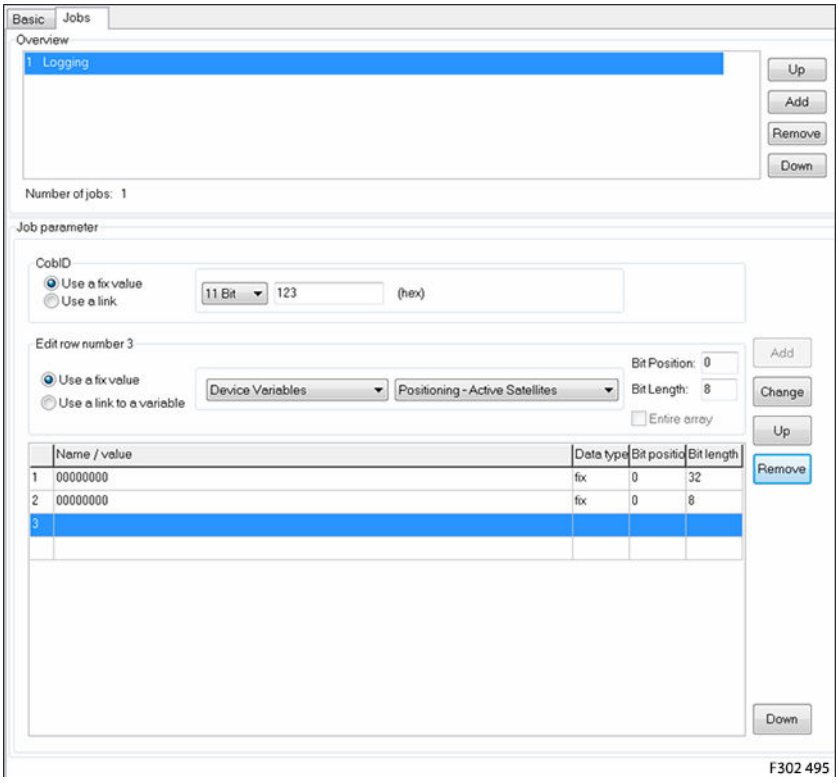
F302 494

9. Select **Logging** in the **Create new job** window.
10. Click on the **OK** button.

    The job is added to the **Overview** list.
11. Enter the ID for the virtual CAN message in the Cob-ID field.
    The ID must not be used by other CAN messages.

Creating object dictionary groups and objects

12. Select the variable type and the variable in the field ADD NEW ROW.
13. Click on the **Add** button next to the field **Add new row**.
    The selected variable is added to the list.
14. Add more variables to the list as required.



15. Save the settings.

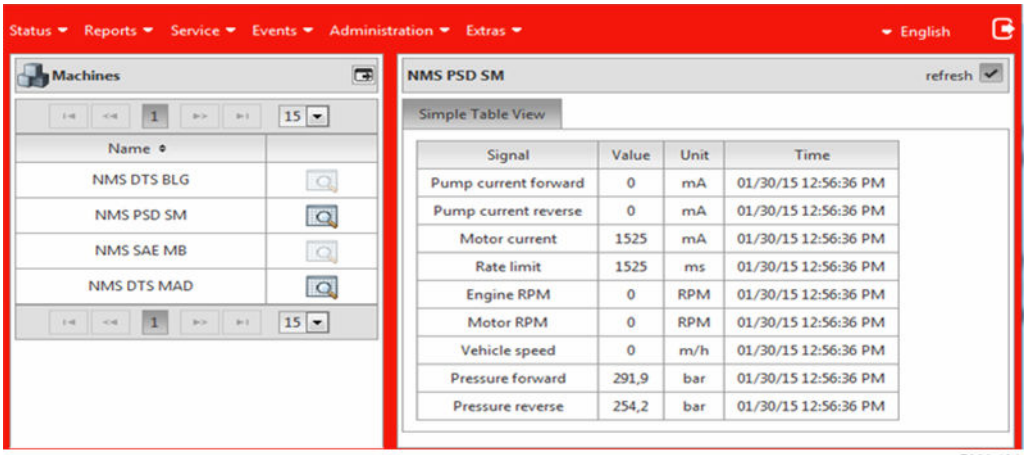
Configure Logged Data View

As a Danfoss Telematics Solutions customer using the WS403, on your DTS portal account you have the possibility to show some of the logging data direct on the portal.

Data view

If the selected machine shows on the right side of the machine overview a highlighted symbol it is possible to see all or a collection of the latest logging data direct on the portal screen.

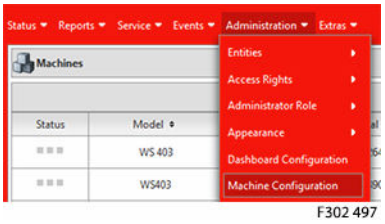
A mouse click on the symbol will show the configured selection of the logging data.



F302 496

Adapt the configuration to the web portal

The display of the logging data needs a configuration via a xml script. This script must be downloaded to portal via **Administration** > **Machine Configuration**.



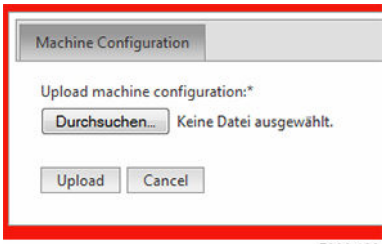
F302 497

Select the **Add Machine Configuration** option to open the file selection menu

F302 498

The selected xml-file will be tested of consistence after pressing the load button. If any error is detected inside the xml-file, the system will reject the file with an error message pointing to the first error position.

Configure Logged Data View



F302 499

After system accept the configuration it is possible to select a number of machines that are able to use this configuration.

Please take care the also the dod-file of the selected machines have the same logging configuration to support the needed logging data.

Don't forget to press the **Save** button to activate this script on the portal.

Elements of the xml file

To support the structure of an xml file it much easier to use an editor that support these structures.

One option it to use the freeware *https://notepad-plus-plus.org/* plus xml support *http://sourceforge.net/projects/notepad-plus/#add-ons-plugins*.

To identify the xml configuration we need a UUID. There are some creators for ID's available on the internet like *https://www.uuidgenerator.net* .

XML Header

The header has fixed and variable values. All values are fixed like in the sample below except the **uuid**, the **customerVersion** and the **keyPrefix**.

```
<?xml version="1.0" encoding="UTF-8" ?>
<?xml-stylesheet type="text/xsl" href="ProemionDataConfiguration.xsl"?>
<DataConfig uuid="767696df-69d7-484b-8648-5e3d8c190779"  customerVersion="0.1.2"  keyPrefix="NMS Telehandler.demo"
    xmlns="http://xml.proemion.com/ProemionDataConfiguration/2012/07"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:xi="http://www.w3.org/2001/XInclude"
    xsi:schemaLocation="http://xml.proemion.com/ProemionDataConfiguration/2012/07
                        http://services.proemion.com/ProemionDataConfiguration/2012/07/ProemionDataConfiguration.xsd" >
```
F302 500

For each xml file we need a unique identification ID **uuid**. To implement a change it is needed to increment the **customerVersion**. The **keyPrefix** shows a short description about this script but is not used internally. This prefix must be present to fulfill the rules of the scheme.

Parsing definition NMS PSD Group	First version	767696df-69d7-484b-8648-5e3d8c190779	0.1.2	

F302 501

Message definition

```
<Name xsi:type="MessageDefinition">
    <Label lang="en" value="Parsing definition NMS PSD Group " />
    <Label lang="de" value="Parsing Definition NMS PSD Gruppe" />
</Name>

<Description xsi:type="MessageDefinition">
    <Label  lang="en" value="First version"/>
    <Label  lang="de" value="Erste Version"/>
</Description>
```
F302 502

The next parts of the header are some message definition to generate a message on the portal to make an identification of the script easier. Both messages will be descripted in all available languages to take

Configure Logged Data View

care that the correct language will displayed regarding the user preference of the user profile. If only one language is defined this label will be used independent of the user preference.

Global dictionary

```
<GlobalDictionary>
    <Message key="label.view.simple" >
        <Label lang="en" value="Simple Table View" />
        <Label lang="de" value="Standard Übersicht" />
    </Message>
    .....................
    .....................
</GlobalDictionary>
```

F302 503

Inside the global directory all used message are defined this section will be used at the definition of the show value. All needed information on the web portal must defined in this section. This included the name of the used tab of the views, the signal name and the unit name. Also in this message definition it is possible to define in all supported languages. The message is identified by the key value.

Transformer

```
<Transformers>
    <Transformer key="transformer.0_125.0">
        <formula xsi:type="LinearFormula">
            <scale>0.125</scale>
            <offset>0</offset>
        </formula>
    </Transformer>
    ..........................
    ..........................
</Transformers>
```

F302 504

The transformer section will define calculation to change transferred binary information in physical units. The transformer includes a key value to identify the transformer. The formula identifies the type of the calculation. Actual only the "LinearFormula" is available as formula. The scale value will be multiplied with the raw data value and additional the offset will be added to create a physical value from the CAN bus raw data.

Units

Include-tag loads description of pre-defined units.

```
<xi:include href="http://xml.proemion.com/ProemionDataConfiguration/
predefinedUnits.xml" parse="xml" xpointer="element(/1)"/>
```

These units can be converted automatically according to the user's Preferences settings in the Portal (Metric / US).

The following predefined units are available when using the include :

< VELOCITY >	predefined.unit.velocity.METERS_PER_SECOND
	predefined.unit.velocity.FOOT_PER_SECOND
< FLOW RATE >	predefined.unit.flow.LITER_PER_HOUR
	predefined.unit.flow.GALLON_LIQUID_US_PER_HOUR
< FORCE >	predefined.unit.force.NEWTON
	predefined.unit.force.POUND_FORCE

Configure Logged Data View

< LENGTH >	predefined.unit.length.KILOMETER
	predefined.unit.length.MILE
	predefined.unit.length.METER
	predefined.unit.length.FOOT
	predefined.unit.length.MILLIMETER
	predefined.unit.length.INCH
< MASS >	predefined.unit.mass.KILOGRAM
	predefined.unit.mass.POUND
< PRESSURE >	predefined.unit.pressure.KILOPASCAL
	predefined.unit.pressure.PSI
	predefined.unit.pressure.BAR
	predefined.unit.pressure.opt.PSI
< TEMPERATUR >	predefined.unit.temperature.CELSIUS
	predefined.unit.temperature.FAHRENHEIT
< SPEED >	predefined.unit.speed.KILOMETERS_PER_HOUR
	predefined.unit.speed.MILES_PER_HOUR
	predefined.unit.speed.METERS_PER_SECOND
	predefined.unit.speed.FOOT_PER_SECOND
< VOLUME >	predefined.unit.volume.LITER
	predefined.unit.volume.GALLON_LIQUID_US

Custom units can be defined inside the section Units.

```
<Units>
    <Unit key="unit.rpm">
        <symbol xsi:type="MessageReference" value="label.unit.rpm" />
        <description xsi:type="MessageReference" value="label.unit.rpm" />
        <storeType xsi:type="NumericValueStoreType" />
    </Unit>
    ..........................
    ..........................
</Units>
```

F302 505

Symbol identifies the symbol or numeric value of the unit. Description is actual not used but must be present to fulfill the rules of the scheme.

Available store types:

- NumericValueStoreType
- TextValueStoreType
- BooleanValueStoreType

Value definitions

```
<ValueDefinitions>
    <ValueDefinition key="value.u8">
        <description xsi:type="MessageReference" value="label.value.u8" />
        <unit>unit.bitfield</unit>
    </ValueDefinition>
    ..........................
    ..........................
</ValueDefinitions>
```

F302 506

This entry combines a value label and a value unit to the defined value. This value is in any cases a floating point value.

Configure Logged Data View

Parsing definition

```
<ParsingDefinition>
    <BinaryStreamDefinition src="CAN">
        <CanMessage canId="0x123" canIdLength="11" mask="0x7FF" protocolStyle="GENERIC">
            <Values>
                <IntValue startPos="0" length="8" endianness="LITTLE" signed="false" continueOnLastPostion="false">
                    <valueDefinition ref="value.u8" />
                </IntValue>
                <IntValue startPos="0" length="8" endianness="LITTLE" signed="false" continueOnLastPostion="false">
                    <valueDefinition ref="value.temp" />
                </IntValue>
                <IntValue startPos="0" length="8" endianness="LITTLE" signed="false" continueOnLastPostion="false">
                    <valueDefinition ref="value.press" />
                </IntValue>
                <FloatValue startPos="8" length="32" endianness="LITTLE" signed="true" continueOnLastPostion="false">
                    <valueDefinition ref="value.r32" />
                </FloatValue>
            </Values>
        </CanMessage>
    ..........................
    ..........................
    </BinaryStreamDefinition>
</ParsingDefinition>
```

F302 507

This parsing information needs to synchronize the needed data for this portal display with the configuration of the remote logging data transmit device. Actual only the CAN data are available for the BinaryStreamDefinition. The message will be defined via the CAN-ID with the corresponding ID-Type and Mask. The actual version support only the GENERIC protocol is supported.

CAN Message examples	Short identifier 11 bit	Long identifier 21 bit
canId	“0x123”	"0x18FF5003"
canIdLength	“11”	“29”
mask	“0x7FF”	"0x1FFFFFFF"

For every used value of a CAN message a value section must be defined.

Possible values can be:

- IntValue
- FloatValue
- SimpleCharValue
- SeparatedCharValue

To separate the value from a CAN stream (8byte = 64 bits) for each value can be defined a start bit and a length of the value. For values bigger than one byte the correct byte order must be selected options are:

- endianness =”LITTLE” -> LSB first
- endianness =”BIG” -> MSB first

For the presentation of the values the system must know if the value shall be showen as signed or unsigned. The selction here is:

- signed = “true”
- signed = “false”

The entry continueOnLastPosition needs to be always false.

The ValueDefinition is reverencing to the previously defined value.

The Transformer is referencing a calculation for the collected value. The Transformer is optional and only needed if the raw data will not represent the actual numeric value.

Extracting bits and multiple of bits from a virtual CAN message

To rebuild status information based on bits and multiple bits below 8 the system needs a mirrored notation of the bit position in the frame, shifted by the length of the information (See *Count in standard order (orange) and mirrored order (yellow)* on page 29)

Configure Logged Data View

Count in standard order (orange) and mirrored order (yellow)

30	31	16	17	18	19	20	21	22	23	8	9	10	11	12	13	14	15	0	1	2	3	4	5	6	7
		X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X	X	X	X
25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
…		Byte 2								Byte 1								Byte 0							

P301 878.A

Example: J1939 Vehicle Fluids PGN 65128 (0x00FE68)

Position	Length	Parameter name	SPN
0	1 byte	Hydraulic temperature	1638
1..0	2 bits	Hydraulic oil filter restriction switch	1713
1..2	2 bits	Winch oil pressure switch	1857
2	1 byte	Hydraulic oil level	2602

P301 879.A

To get this information from a logged CAM message, it needs to be a setup like follow:

```
<CanMessage canId="0x18FE6800" canIdLength="29" mask="0x1FFFFFFF" protocolStyle="GENERIC">
    <Values>

        <IntValue startPos="0" length="8" endianness="LITTLE" signed="false" continueOnLastPost on="false">
            <valueDefinition ref="value.hydraulic.temp" />
        </IntValue>

        <IntValue startPos="14" length="2" endianness="LITTLE" signed="false" continueOnLastPost on="false">
            <valueDefinition ref="value.hydraulic.oilfilter.restrict.switch" />
        </IntValue>

        <IntValue startPos="12" length="2" endianness="LITTLE" signed="false" continueOnLastPost on="false">
            <valueDefinition ref="value.hydraulic.oil.press.switch" />
        </IntValue>

        <IntValue startPos="16" length="8" endianness="LITTLE" signed="false" continueOnLastPost on="false">
            <valueDefinition ref="value.hydraulic.oil.level" />
        </IntValue>

    </Values>
</CanMessage>
```

P301 880.A

View definition

Each ViewDefinition is displayed as one tab on the portal. Actual there are the following types are available:

- SimpleTableViewDefinition
- CustomTableViewDefinition
- DataHistoryTableViewDefinition
- ErrorTableViewDefinition

The title is displayed in the tab header.

Configure Logged Data View

```
<ViewDefinitions>
    <ViewDefinition key="view.simple.table" xsi:type="SimpleTableViewDefinition">
        <title xsi:type="MessageReference" value="label.view.simple" />
        <ValueView valueDefinitionRef="value.u8" displayUnit="false"/>
        <ValueView valueDefinitionRef="value.spn.190" format="%6.0f" />
        <ValueView valueDefinitionRef="value.press" />
        <ValueView valueDefinitionRef="value.u8" displayUnit="false">
            <conditional>
                <case>
                    <condition xsi:type="ComparatorCondition" operator="Equals"><value>0</value></condition>
                    <action xsi:type="replaceValue"><Text><message xsi:type="MessageReference" value="label.cond.0"/></Text></action>
                    <action xsi:type="setTextFormat"><format color="#FF0000" backgroundColor="#00FFFF"/></action>
                </case>
                <case>
                    <condition xsi:type="ComparatorCondition" operator="Equals"><value>1</value></condition>
                    <action xsi:type="replaceValue"><Text><message xsi:type="MessageReference" value="label.cond.1"/></Text></action>
                    <action xsi:type="setTextFormat"><format color="#00FF00" bold="true"/></action>
                </case>
                <case>
                    <condition xsi:type="ComparatorCondition" operator="Equals"><value>2</value></condition>
                    <action xsi:type="replaceValue"><Text><message xsi:type="MessageReference" value="label.cond.2"/></Text></action>
                    <action xsi:type="setTextFormat"><format color="#0000FF" italic="true"/></action>
                </case>
                <default>
                    <action xsi:type="replaceValue"><Text><message xsi:type="MessageReference" value="label.cond.bigger"/></Text></action>
                    <action xsi:type="setTextFormat"><format color="#000000" underline="true"/></action>
                </default>
            </conditional>
        </ValueView>
    </ViewDefinition>
</ViewDefinitions>
```

F302 508

The ValueView reverence to defined Value Definitions. Additional information in this row are related to show a unit or not and to format a value in C-type configuration (only f = float are allowed). Also a conditional analysis of a value is possible.

Simple and custom table are tables to show a bunch of actual data. The error and history view are useful for event data like error flags. This kind of message can be shown with status flag value and time of appear.

Inside a Value View the name of the value and the appearance of this entry will be defined. Additional to the numeric value view a conditional option can show text and hints based on a numerical value. A condition has one default section and one or more case sections. As selection for the cases the following options are available:

- LessThan
- Equals
- GreatherThan

Inside a valid case section the following actions can be done:

- replaceValue
- setTextFormat

With the text format option several of standard options can be used:

- bold
- italic
- underline
- color
- backgroundColor

The color definition is a 24 bit hexadecimal value with a byte for red, green and blue part.

- #RRGGBB
- #FF0000 -> color red
- #00FF00 -> color green
- #0000FF -> color blue
- #000000 -> color black
- #FFFFFF -> color white

In the custom view table it is possible to create a table of values in rows and columns. A headline and a row description are also possible. The unit is a constituent part of the value and shown direct behind the value in the same window. If a unit is not needed a empty Unit is to define for the value definition.

Configure Logged Data View

```
<ViewDefinition key="view.custom.table" xsi:type="CustomTableViewDefinition">
    <title xsi:type="MessageReference" value="label.view.custom"/>
    <columns>
        <column>
            <header><Text><message xsi:type="MessageReference" value="label.unit.None"/></Text></header>
            <cells>
                <cell><content><Text><message xsi:type="MessageReference" value="label.value.radio.lever"/></Text></content></cell>
                <cell><content><Text><message xsi:type="MessageReference" value="label.value.slider.actual"/></Text></content></cell>
                <cell><content><Text><message xsi:type="MessageReference" value="label.value.slider.setpoint"/></Text></content></cell>
            </cells>
        </column>
        <column>
            <header><Text><message xsi:type="MessageReference" value="label.section.1"/></Text></header>
            <cells>
                <cell><content><ValueView valueDefinitionRef="value.radio.lever.1" /></content></cell>
                <cell><content><ValueView valueDefinitionRef="value.slider.setpoint.1" /></content></cell>
                <cell><content><ValueView valueDefinitionRef="value.slider.actual.1" /></content></cell>
            </cells>
        </column>
        ..............................
        ..............................
         <column>
            <header><Text><message xsi:type="MessageReference" value="label.section.7"/></Text></header>
            <cells>
                <cell><content><ValueView valueDefinitionRef="value.radio.lever.7" /></content></cell>
                <cell><content><ValueView valueDefinitionRef="value.slider.setpoint.7" /></content></cell>
                <cell><content><ValueView valueDefinitionRef="value.slider.actual.7" /></content></cell>
            </cells>
        </column>
        <column>
            <header><Text><message xsi:type="MessageReference" value="label.section.8"/></Text></header>
            <cells>
                <cell><content><ValueView valueDefinitionRef="value.radio.lever.8" /></content></cell>
                <cell><content><ValueView valueDefinitionRef="value.slider.setpoint.8" /></content></cell>
            </cells>
        </column>
    </columns>
</ViewDefinition>
```

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Appendix

CLF file

File header

Type	Length [bytes]	Byte Order	Value/Range	Comment
Start byte	1	*	0x55	STX (Start of TeXt): Marks the beginning of a datagram
File format version	2	Big Endian	0x0000..0xFFFF	Version indicating the file format's version; Current Version = 13.
Length Byte	2	Big Endian	0x0000..0xFFFF	Length of data to follow (everything after Encryption Byte, including all messages and up to, but not including, the Checksum XOR, Checksum ADD and Stop Bytes)
Encryption Byte	1	*	00	00 = data is not encrypted
			01	01 = data is encrypted
			Other	Reserved
Length of header	1	*	0x00..0x20	Header String Length= 'n'. A value of '00' indicates there are no Header String values to follow. Note: valid header length is within 0-32 bytes (was 0-255 in version 12)
Header String Value 1	1	*	0x00..0xFF	First character or data byte of Header String (ASCII) for the file. Typically a Vehicle Identification Number (VIN)
Header String Value 2	1	*	0x00..0xFF	
…				
Header String Value 'n'	1	*	0x00..0xFF	

File payload

Typical message definition

Type	Length [bytes]	Byte Order	Value/Range	Comment
Message Type	1	*	0 - 7	CAN Data
			8 - 15	Statistic Data
			16 - 31	GPS Data
			32 - 63	I/O Data
			64 - 127	RS-232 Data
			128 - 192	Customer-Specific
			Others	Reserved
Timestamp type	1	*	00	No timestamp for this message
			01	UNIX message timestamp
			Others	Reserved
Message Length	2	Big Endian	0x0000..0xFFFF	The sum of bytes to follow for this message, including Message Values (1-'n') and Timestamp Values (1-'z').
Message Value 1	1	*	0x00..0xFF	Message's payload: bytes 1-'n'. Format determined by Message Type and defined in Section 2, "File Payload" [3].
Message Value 2	1	*	0x00..0xFF	

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Type	Length [bytes]	Byte Order	Value/Range	Comment
…	1	*	0x00..0xFF	
Message Value 'n'	1	*	0x00..0xFF	Last byte of Message Payload
…				
Timestamp Value 1	1	*	0x00..0xFF	Timestamp Payload: bytes 1-'z', if Timestamp. Type is nonzero. Format determined by Timestamp Type as defined in Section 3, "Message Tail" [11].
Timestamp Value 2	1	*	0x00..0xFF	
…				
Timestamp Value 'z'	1	*	0x00..0xFF	Last byte of Timestamp payload

Repeat the above sequence for all subsequent messages in file. See Section 2, "File Payload" [3] above

Message Payload Definitions

Message Type 0 = 11-bit CAN Message

Type	Length [bytes]	Byte Order	Value/Range	Comment
Message Value 1: Bit-mask	1	*	0x00..0xFF	8 bits, each bit representing, respectively, which of the 8 Data Bytes (1-'n') of the original 11-bit message are included.
Message Header	2	Big Endian	0x000..0x7FF	11-bit CAN message ID
Data Byte Value 1	1	*	0x00..0xFF	First byte of up to 8 Data Bytes in the original 11-bit message
Data Byte Value 2	1	*	0x00..0xFF	Second byte of up to 8 Data Bytes in the original 11-bit message
…				
Data Byte Value 'n'	1	*	0x00..0xFF	Last byte of up to 8 Data Bytes in the original 11-bit message

Message Type 1 = 29-bit CAN Message

Type	Length [bytes]	Byte Order	Value/Range	Comment
Message Value 1: Bit-mask	1	*	0x00..0xFF	8 bits, each bit representing, respectively, which of the 8 Data Bytes (1-'n') of the original 29-bit message are included. If Bitmask = '00', the message length can be equal to 0x8 and up to 0x6F9.
Message Header	4	Big Endian	0x0000 0000.. 0x7FFF FFFF	11-bit CAN message ID
Data Byte Value 1	1	*	0x00..0xFF	First byte of up to 8 Data Bytes in the original 29-bit message
Data Byte Value 2	1	*	0x00..0xFF	Second byte of up to 8 Data Bytes in the original 29-bit message
…				
Data Byte Value 'n'	1	*	0x00..0xFF	Last byte of up to 8 Data Bytes in the original 29-bit message

Message Type 2 = 11-bit CAN Message with source

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Type	Length [bytes]	Byte Order	Value/Range	Comment
Message Value 1: Source Bus	1	*	0x01..0xFF	Some of our logging hardware has more than one CAN interface. This value represents the physical CAN bus from which the message originated.
Bit-mask	1	*	0x00..0xFF	8 bits, each bit representing, respectively, which of the 8 data bytes (1-'n') of the original 11-bit message are included.
Message Header	2	Big Endian	0x000..0x7FF	11-bit CAN message ID
CAN Data Length Code introduced with V.15	1	*	0x00..0xFF	CAN DLC - necessary to work with bitmask
Data Byte Value 1	1	*	0x00..0xFF	First byte of up to 8 Data Bytes in the original 11-bit message
Data Byte Value 2	1	*	0x00..0xFF	Second byte of up to 8 Data Bytes in the original 11-bit message
…				
Data Byte Value 'n'	1	*	0x00..0xFF	Last byte of up to 8 Data Bytes in the original 11-bit message

Message Type 3 = 29-bit CAN Message with source

Version 14+

Type	Length [bytes]	Byte Order	Value/Range	Comment
Message Value 1: Source Bus	1	*	0x01..0xFF	Some of our logging hardware has more than one CAN interface. This value represents the physical CAN bus from which the message originated.
Bit-mask	1	*	0x00..0xFF	8 bits, each bit representing, respectively, which of the 8 data bytes (1-'n') of the original 29-bit message are included. If bitmask = '00', the message length can be equal to 0x8 and up to 0x6F9.
Message Header	4	Big Endian	0x0000 0000..0x7FFF FFFF	29-bit CAN message ID
CAN Data Length Code introduced with V.15	1	*	0x00..0xFF	CAN DLC - necessary to work with bitmask
Data Byte Value 1	1	*	0x00..0xFF	First byte of up to 8 Data Bytes in the original 29-bit message
Data Byte Value 2	1	*	0x00..0xFF	Second byte of up to 8 Data Bytes in the original 29-bit message
…				
Data Byte Value 'n'	1	*	0x00..0xFF	Last byte of up to 8 Data Bytes in the original 29-bit message

Appendix

Message Type 16 = GPS Location Data (J1939 format)

Type	Length [bytes]	Byte Order	Value/Range	Comment
GPS Latitude	4	Little Endian	0x00000000.. 0xFAFEE27A	Scalar: 10-7 deg/bit Offset: -210 deg Range: -210 deg (SOUTH)a to +211.108122 deg (NORTH)
			0xFFFFFFFF	Invalid Data
GPS Longitude	4	Little Endian	0x00000000.. 0xFAFEE27A	Scalar: 10-7 deg/bit Offset: -210 deg Range: -210 deg (WEST) to +211.108122 deg (EAST)b
			0xFFFFFFFF	Invalid Data

a Reference from J1939-71 SPN 584

b Reference from J1939-71 SPN 585

Message Type 17 = GPS Movement Data

Type	Length [bytes]	Byte Order	Value/Range	Comment
Heading	4	Little Endian	0x00000000.. 0xFFFFFFFF	Signed 32-bit Int Scaling: 1e-5 Degrees
Ground Speed (2-D)	4	Little Endian	0x00000000.. 0xFFFFFFFF	cm/second

Timestamp Value Definitions

Timestamp Type 00 = No Timestamp

Type	Length [bits]	Byte Order	Value/Range	Comment
No timestamp	0	*	Null	Zero length.

Timestamp Type 01 = UNIX Timestamp (seconds)

Type	Length [bits]	Byte Order	Value/Range	Comment
UNIX timestamp	4	Big Endian	0x00000000.. 0xFFFFFFFF	Timestamp for each message (32 bit positive or negative number of seconds since midnight on January 1, 1970).

Message tail

Type	Length [bits]	Byte Order	Value/Range	Comment
Checksum XOR	1	*	0x00..0xFF	XOR checksum over encryption byte (offset 5) and all subsequent bytes.
Checksum ADD	1	*	0x00..0xFF	ADD checksum over encryption byte (offset 5) and all subsequent bytes including XOR checksum bytes. All bytes will be summed up and the carry over will be discarded.
Stop Byte	1	*	0xAA	ETX (End of Text): Marks the end of the file

Appendix

Bitmask

Empty or irrelevant bytes of CAN messages can be omitted by defining a proper bitmask. A set bit marks a transmitted byte, an unset bit a omitted bytes.

The bits are interpreted in order of their significance (Bitmask: MSB 8 7 6 5 4 3 2 1 LSB, Message Bytes: 01 02 03 04 05 06 07 08).

A bitmask of 0x04 defines, that only the 3rd byte of the can message is transferred.

When using bitmasks, the can messages can't be longer than 8 bytes. If all bit are either unset (0x00) or set (0xFF) the message is transferred completely and, if the message type supports it, can be longer than 8 bytes.

Examples

Example 1

The first example explains the order in which file section will occur.

The second example will demonstrate what the data byte will look like in the file format.

Section 1, “File Header” [3]

File Header - The file header will always start the file structure.

This contains Start Byte, File Format Version, Length Bytes, Encryption Byte and the File Header.

Section 2, “File Payload” [3]

Message Header - The section describes the Message Type that is to follow, the Timestamp Type that is to follow and the Message Length, which is the length of the Message Values and Timestamp Values. Message Payload - This is unique to each Message Type. The length of this section is defined by Message Length in the Message Header.

The meaning of the data bytes is detailed in the following sections.

Message Type 0 - 11 bit CAN Message - Node 1

Each 11 bit CAN message consists of a Bitmask, Message Header and up to 8 Data Bytes. The user has the ability to remove irrelevant or undefined payload bytes from the original 11-bit CAN message using the Bitmask. The Bitmask allows the message to retain the position of the bytes in the message when irrelevant bytes are removed from the message. The 11 bit Message Header is the CAN ID of the 11 bit message.

The meaning of the 11 bit Message Value is user defined.

Message Type 1 - 29 bit CAN Message - Node 1

Each 29 bit CAN message consists of a Bitmask, Message Header and up to 1,785 Data Bytes. The user has the ability to remove irrelevant or undefined payload bytes from the original 29-bit CAN message using the Bitmask. The Bitmask allows the message to retain the position of the bytes in the message when irrelevant bytes are removed from the message. If the Bitmask is 00, then the 29 Bit Message Values can be greater than or equal to 8 bytes but less than or equal to 1,785. The 29 bit Message Header is the CAN ID of the 29 bit message.

29 bit Message Values that have a length longer than 8 are often created using J1939 multicast BAM message.

Please reference J1939-21. The meaning of the 29 bit Message Value is user defined.

Appendix

Message Type 2 - 11 bit CAN Message - Node 2

Exactly the same as type 0, but the message originates from the second CAN node of the micro controller.

This is a physically separate CAN bus.

Message Type 3 - 29 bit CAN Message - Node 2

Exactly the same as type 1, but the message originates from the second CAN node of the micro controller.

This is a physically separate CAN bus.

Message Type 16 - GPS Location Data (J1939 Format)

The GPS Data message is a fixed length of 8 bytes. The first 4 bytes are GPS Latitude coordinate and the second 4 bytes are the GPS Longitude coordinate. The binary value is an unsigned 32 bit.

To decode the meaning of this binary value, convert to decimal; apply the scalar of 107 and the offset of -210 (decimal).

This method of conversion is valid for both GPS Latitude and Longitude.

If the Value is 'FFFFFFFF' then the GPS data is invalid.

Message Type 17 - GPS Movement Data (J1939 Format)

This message contains the heading and speed data of the device. The heading is encoded as a four-byte signed integer. The scaling is 1e-5 degrees. The speed is a four byte unsigned integer representing centimeters per second.

Timestamp Type 00 = No Time Stamp

No Time Stamp has a length of zero. Thus, there is no timestamp in this message.

Timestamp Type 01 = UNIX Time Stamp

The UNIX Time Stamp has a length of 4 bytes. The 32 bit signed binary number can be converted.

This is a count of the number of seconds that have passed since January 1st, 1970.

Section 3, “Message Tail” [11]

Checksum XOR - The XOR of all bytes from the encryption byte to all bytes up to but no including the Checksum XOR byte.

Checksum ADD - The SUM off all bytes from the encryption byte to all bytes up to, but not including, the Checksum ADD byte.

Stop Byte. - Marks the end of the binary file. (ETX)

Example 2

Let us have a look at the following example:

Line 1:	55 00 0C 00 37 00 05 56 49 4E 20 31
Line 2:	00 00 00 05 0C 02 3A FF AA
Line 3:	41 01 00 0B 01 02 03 04 05 06 07 47 79 F3 00
Line 4:	08 00 00 04 00 19 00 05
Line 5:	21 01 00 08 0A 62 00 64 47 79 F3 01
Line 6:	22 00 00 01 4A
Line 7:	4A 44 AA

Appendix

The above binary file contains the following information

- Line 1 - File Header:
  - Version: 12
  - Header: VIN 1
  - Length: 55
  - Data is not encrypted
- Line 2 - 11 bit CAN Message:
  - CAN Message ID: 570
  - Message Values: 00 00 00 00 FF AA 00 00
  - No Timestamp
- Line 3 - RS232 String:
  - RS232 Values: 01 02 03 04 05 06 07
  - Timestamp: January 1st, 2008, 08:00:00
- Line 4 - Statistics String:
  - On/Off Counter: 25
  - GSM Registration Counter: 5
  - No Timestamp
- Line 5 - Analog Input:
  - Value 1: 2658
  - Value 2: 100
  - Timestamp: January 1st, 2008, 08:00:01
- Line 6 - Digital Output:
  - Value 1: High
  - Value 2: Low
  - Other: Not Present
  - No Timestamp
- Line 7 - Checksum XOR:
  - Checksum and Stop Byte

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